Pushing the Envelope			
2007 Science			
Grade Expectations			
Vermont Science			
Grades 5-6			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	VT	SCI.5-6.S5-6:9.1	Investigating and developing conclusions that explain how the relative volume or mass of an object affects the density of the object.
Types of Engines (pgs. 11-23)	VT	SCI.5-6.S5-6:20.a	Inertia is the tendency of an object to resist a change in motion and depends upon the object's mass. Stationary objects tend to remain stationary; moving objects tend to continue moving (Newton's First Law).
Types of Engines (pgs. 11-23)	VT	SCI.5-6.S5-6:21.1	Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.
Types of Engines (pgs. 11-23)	VT	SCI.5-6.S5-6:21.a	A force applied to a moving object will change the object's speed, direction or both.
Chemistry (pgs. 25-41)	VT	SCI.5-6.S5-6:14.a2	Energy is required to transform the physical state of a substance from solid to liquid to gas, while conserving mass. Physical changes are reversible.
Chemistry (pgs. 25-41)	VT	SCI.5-6.S5-6:15.1	Observing evidence of simple chemical change to identify that new substances are formed when a chemical reaction has occurred (e.g., rusted nail, vinegar combined with baking soda).
Physics and Math (pgs. 43-63)	VT	SCI.5-6.S5-6:20.1	Design an investigation to collect evidence about an object's inertia and explaining their observation in terms of the object's tendency to resist a change in motion.
Physics and Math (pgs. 43-63)	VT	SCI.5-6.S5-6:20.a	Inertia is the tendency of an object to resist a change in motion and depends upon the object's mass. Stationary objects tend to remain stationary; moving objects tend to continue moving (Newton's First Law).
Physics and Math (pgs. 43-63)	VT	SCI.5-6.S5-6:21.1	Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.
Physics and Math (pgs. 43-63)	VT	SCI.5-6.S5-6:21.a	A force applied to a moving object will change the object's speed, direction or both.
Rocket Activity (pgs. 69-75)	VT	SCI.5-6.S5-6:21.a	A force applied to a moving object will change the object's speed, direction or both.
Pushing the Envelope			
2007 Science			
Grade Expectations			
Vermont Science			
Grades 7-8			
Activity/Lesson	**State**	**Standards**	

Types of Engines (pgs. 11-23)	VT	SCI.7-8.S7-8:19.2	Describing and explaining how the acceleration of an object is proportional to the force on the object and inversely proportional to the mass of the object.
Types of Engines (pgs. 11-23)	VT	SCI.7-8.S7-8:19.c	Acceleration is a relationship between the force applied to a moving object and the mass of the object (Newton's Second Law).
Types of Engines (pgs. 11-23)	VT	SCI.7-8.S7-8:21.c	Unbalanced forces will cause changes in speed or direction of an object's motion.
Chemistry (pgs. 25-41)	VT	SCI.7-8.S7-8:13.1	Using real world examples (tires, balloons, soda), predict and explain the effect that a change in one variable (pressure, temperature or volume) will have on the others.
Chemistry (pgs. 25-41)	VT	SCI.7-8.S7-8:13.a	There exists a predictable relationship among the volume, temperature, and amount of a gas and the pressure the gas exerts.
Chemistry (pgs. 25-41)	VT	SCI.7-8.S7-8:13.b	For any specified amount of a gas, the pressure that the gas exerts will increase as the temperature increases or the volume of the gas decreases. The pressure that the gas exerts will decrease as the temperature decreases or the volume of the gas increases.
Physics and Math (pgs. 43-63)	VT	SCI.7-8.S7-8:19.c	Acceleration is a relationship between the force applied to a moving object and the mass of the object (Newton's Second Law).
Physics and Math (pgs. 43-63)	VT	SCI.7-8.S7-8:21.1	Diagramming or describing, after observing a moving object, the forces acting on the object before and after it is put into motion (Students include in their diagram or description, the effect of these forces on the motion of the object.)
Physics and Math (pgs. 43-63)	VT	SCI.7-8.S7-8:21.a	An object that is not subjected to a force will continue to move at a constant speed and in a straight line.
Physics and Math (pgs. 43-63)	VT	SCI.7-8.S7-8:21.b	If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another,depending on their direction and magnitude.
Physics and Math (pgs. 43-63)	VT	SCI.7-8.S7-8:21.c	Unbalanced forces will cause changes in speed or direction of an object's motion.
Rocket Activity (pgs. 69-75)	VT	SCI.7-8.S7-8:19.b	Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.
Rocket Activity (pgs. 69-75)	VT	SCI.7-8.S7-8:19.c	Acceleration is a relationship between the force applied to a moving object and the mass of the object (Newton's Second Law).

Rocket Activity (pgs. 69-75)	VT	SCI.7-8.S7-8:21.1	Diagramming or describing, after observing a moving object, the forces acting on the object before and after it is put into motion (Students include in their diagram or description, the effect of these forces on the motion of the object.)
Rocket Activity (pgs. 69-75)	VT	SCI.7-8.S7-8:21.a	An object that is not subjected to a force will continue to move at a constant speed and in a straight line.
Rocket Activity (pgs. 69-75)	VT	SCI.7-8.S7-8:21.b	If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another,depending on their direction and magnitude.
Rocket Activity (pgs. 69-75)	VT	SCI.7-8.S7-8:21.c	Unbalanced forces will cause changes in speed or direction of an object's motion.
Pushing the Envelope			
2007 Science			
Grade Expectations			
Vermont Science			
Grades 9-12			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	VT	SCI.9-12.S9-12:21.b	If an unbalanced force acts on an object it will accelerate; the acceleration is proportional to the net force and inversely proportional to the mass of the object (Newton's Second Law F=ma). (e.g. A vehicle accelerates more slowly when it's full of passengers.)
Chemistry (pgs. 25-41)	VT	SCI.9-12.S9-12:13.a	There are specific proportional relationships that exist among volume, pressure, temperature and amount of gas (mass) in a system.
Chemistry (pgs. 25-41)	VT	SCI.9-12.S9-12:15.a	The total mass of reactants of any chemical reaction is the same as the total mass of the products of that chemical reaction (Conservation of Mass).
Physics and Math (pgs. 43-63)	VT	SCI.9-12.S9-12:20.a	An object at rest or moving uniformly (in a straight line) will remain so unless acted upon by an external unbalanced (net) force (Newton's First Law, The Law of Inertia). (e.g., We wear seatbelts because our body has a tendency to keep moving when the vehicle stops.)
Physics and Math (pgs. 43-63)	VT	SCI.9-12.S9-12:21.a	Every body continues in its state of rest or in a straight line, unless it is compelled to change that state by forces impressed upon it (Newton's First Law).
Physics and Math (pgs. 43-63)	VT	SCI.9-12.S9-12:21.b	If an unbalanced force acts on an object it will accelerate; the acceleration is proportional to the net force and inversely proportional to the mass of the object (Newton's Second Law F=ma). (e.g. A vehicle accelerates more slowly when it's full of passengers.)

Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9-12:20.a	An object at rest or moving uniformly (in a straight line) will remain so unless acted upon by an external unbalanced (net) force (Newton's First Law, The Law of Inertia). (e.g., We wear seatbelts because our body has a tendency to keep moving when the vehicle stops.)
Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9-12:21.a	Every body continues in its state of rest or in a straight line, unless it is compelled to change that state by forces impressed upon it (Newton's First Law).
Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9-12:21.b	If an unbalanced force acts on an object it will accelerate; the acceleration is proportional to the net force and inversely proportional to the mass of the object (Newton's Second Law F=ma). (e.g. A vehicle accelerates more slowly when it's full of passengers.)
Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9-12:21.c	Whenever one object exerts a force on a second object, a force equal in magnitude but opposite in direction is exerted on the first object. Forces always arise in pairs (Newton's Third Law). (e.g., When you lean against a wall, the wall pushes back at you.)